Small Business Innovation Research/Small Business Tech Transfer

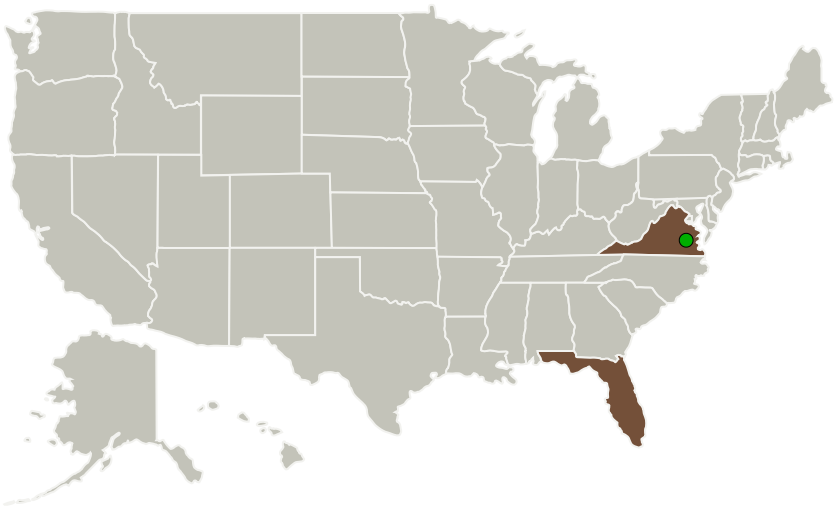
Low Profile, Low Frequency, Adaptively-Tuned Acoustic Liner, Phase I

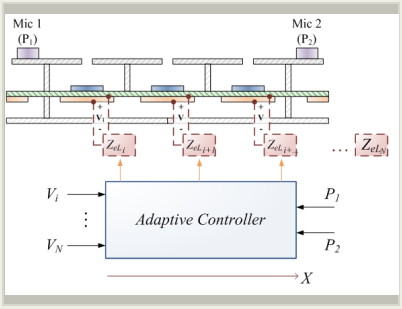
Completed Technology Project (2016 - 2016)

Project Introduction

Conventional approaches to aircraft engine noise reduction via passive acoustic liners are limited in performance, particularly at lower frequencies, where improvements are gained through increased liner depth. Typical engine nacelle installation clearances, however, limit liner depth and prevent further improvements in low frequency noise reduction using these conventional approaches. The proposed innovation addresses these limitations via a low-profile, tunable acoustic liner for modern aircraft engines capable of significant noise attenuation at lower frequencies than currently achievable. The innovative approach lowers the resonant frequency and enables significant reductions in cavity size and volume. Significant net weight savings is achieved due to the large reductions in cavity volume (via corresponding decreases in cavity wall surface area). The end result is lower frequency noise attenuation with simultaneous reductions in liner depth and weight. The proposed innovations provide the following benefits for acoustic noise reduction: ? Optimum absorption of sound at frequencies half of those achievable with currently available technologies ? Decreased liner depth ? Decreased liner weight ? In-situ, automatic tunability for optimum absorption under different engines and engine conditions. ? Broadband operation through MDOF performance and individual impedance tuning

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Interdisciplinary Consulting Corporation	Lead Organization	Industry	Gainesville, Florida
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Florida	Virginia

Project Transitions

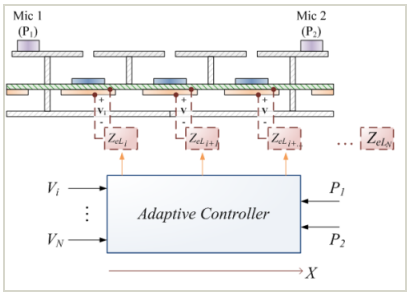
June 2016: Project Start

December 2016: Closed out

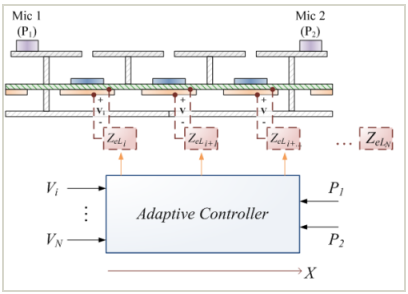
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139900)*

Images



Briefing Chart Image
Low Profile, Low Frequency, Adaptively-Tuned Acoustic Liner, Phase I
(https://techport.nasa.gov/image/131364)



Final Summary Chart Image
Low Profile, Low Frequency, Adaptively-Tuned Acoustic Liner, Phase I Project Image
(https://techport.nasa.gov/image/133213)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Interdisciplinary Consulting Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

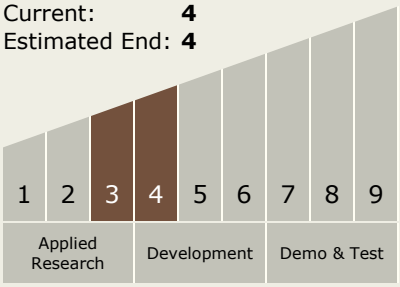
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Stephen B Horowitz

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2016 - 2016)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System